

Online Assembly Guide : 90mm Refractor Telescope

INTRODUCTION

Congratulations! You have bought a wonderful telescope. This is a precision optical instrument, and you have many wonderful evenings of observing the night sky ahead of you. This on-line guide is to help you assemble your telescope properly.

Of course, the telescope comes with an assembly guide, and we were able to assemble our first telescope in exactly 1 hour and 15 minutes using that guide. We had never assembled a telescope before, so you can be assured that the paper assembly instructions will do the job.

However, we know that many people are visually oriented and that pictures of the assembly process would be helpful. Since your telescope assembly guide and instruction manual does not have a lot of pictures, we have put together this online guide to help you assemble your telescope for your first night of observing. The paper guide in your telescope puts the telescope together in a slightly different order as we do in this online guide, so you may have trouble following both at the same time.

Once your telescope is assembled and ready to go, the rest is up to you. Learning astronomy is all the fun anyhow! So let's get started . . .

ASSEMBLING THE TRIPOD Putting the tripod together is the hardest part of the whole job and, unfortunately, it comes first.

Step 1: Find one of the three tripod legs as shown in Figure 1 below.



Figure 1 -- A tripod leg.

Step 2: Find the three tripod leg tightening screws shown in Figure 2 below.



Figure 2 -- Tripod leg tightening screws.

Step 3: Insert the tightening screw into the side of the tripod leg as shown in Figure 3 below.



Figure 3 -- Inserting the tripod tightening screw into the tripod leg.

Step 4: Find the base mount shown in Figure 4 below.



Figure 4 -- The base mount.

Step 5: Find the base mount assembly parts. There are 3 sets of parts. Each of the 3 sets has 5 parts: 1 hexagonal ended bolt, 1 tightening nut, 2 large flat washers and 1 small flat washer. These parts are pictured in the upper left corner of Figure 5 below.



Figure 5 -- The base mount assembly parts.

Step 6: BE CAREFUL HERE. READ THIS STEP CAREFULLY! THEN READ STEPS 7 THROUGH 13 BEFORE CONTINUING ON TO THE NEXT STEP. Figure 6 shows what you are going to do in the next few steps. You are going to attach the base mount to the one end of the tripod. Please notice that there is a metal flap hanging off of the tripod leg in Figure 6 below. That is the mounting for the accessory tray. When you attach the base mount in the next few steps, be sure that the accessory tray mounting flap is on the inside of the tripod -- as shown in Figure 6. (Take a peak ahead at Figures 13 & Figure 20 to get a look at why those accessory tray flaps need to be on the inside).



Figure 6 -- The base mount attached to one tripod leg. Note the position of the accessory tray.

Step 7: Insert the hexagonal bolt partway into the end of the tripod. Then place one of the large flat washers on the end of the bolt as shown in Figure 7.



Figure 7 -- Placing the first large flat washer on the tripod assembly.

Step 8: The first large flat washer should be set as shown in Figure 8 below.



Figure 8 -- Setting the first large flat washer in the tripod assembly.

Step 9: Next, attach the base mount to the tripod. Be sure to use the second flat washer on the other side of the tripod assembly as shown in figure 9 below.

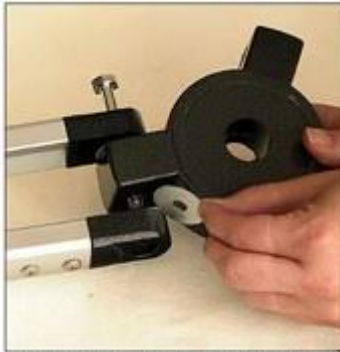


Figure 9 -- Attaching the base mount to the tripod.

Step 10: Place the small flat washer on the outside of the tripod assembly as shown in Figure 10.



Figure 10 -- Placement of the small flat washer on the tripod assembly.

Step 11: Make sure the hexagonal bolt is locked into place and flush (flat) with the tripod assembly as shown in Figure 11.



Figure 11 -- Hexagonal bolt should be flush with the tripod assembly.

Step 12: Screw the tightening nut on as shown in Figure 12.



Figure 12 -- Tightening screw on completed tripod assembly with base mount.

Step 13: Repeat Steps 7 - 12 on the second tripod leg so that it is assembled as shown in Figure 13 below with the accessory tray flap on the inside of the tripod. Then attach the third tripod leg as well and you are done!



Figure 13 -- Two of the tripod legs attached to the base mount.

ATTACHING THE ACCESSORY TRAY

You may want to find a small screwdriver you help get the accessory tray on good and tight.

Step 14: Locate the metal accessory tray and the component screws. There should be 3 round head metal machine screws, 6 small washers and 3 wing nuts as shown in Figure 14 below.



Figure 14 -- The accessory tray and assembly parts.

Step 15: Insert one of the screws and a washer into one of the small holes located on the rim of the accessory tray as shown in Figure 15 below. **YOU MAY HAVE A TRIANGLE SHAPED ACCESSORY TRAY -- that's ok, just insert the washer as shown on the upper side of the tray.** The accessory tray has a metal lip that will be facing upwards when the tray is attached to the tripod.



Figure 15 -- Insert the first washer and screw into the top of the assembly tray.

Step 16: Attach the accessory tray to the accessory tray mount flap on one of the 3 tripod legs as shown in Figure 16 below. Attaching the accessory tray to the outer most hole on the flap will provide the most stability for your telescope. This is the same case if you have a triangle shaped accessory tray.



Figure 16 -- Attach accessory tray to the flap on one of the tripod legs.

Step 17: Place a second washer over the screw on the bottom of the accessory tray flap as shown in Figure 17.



Figure 17 -- Place a second washer over the screw when you attach the accessory tray.

Step 18: Attach the wing nut to the bottom of the screw as shown in Figure 18.



Figure 18 -- Attach the wing nut to the bottom of the accessory tray.

Step 19: You may want to use a screwdriver, as shown in Figure 19 below, to hold the screw in place while you tighten the wing nut.

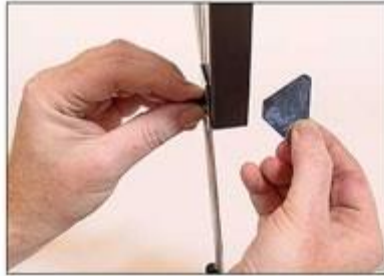


Figure 19 – Using a screwdriver to help tighten the wing nut.

Step 20: Repeat Steps 15 - 19 to finish attaching the accessory tray to the tripod. When you are finished, the tripod should be assembled as shown in Figure 20 below.



Figure 20 – The finished tripod assembly with attached accessory tray.

ASSEMBLING THE EQUATORIAL MOUNT

Believe it or not, you will be finished in just a few minutes. The rest of the assembly is very easy.

Step 21: Find the equatorial mounting and the single large horizontal axis clamp screw, both shown in Figure 21 below.



Figure 21 -- The equatorial mount and horizontal axis clamp screw.

Step 22: MAKE SURE THE TRIPOD LEGS ARE GOOD AND TIGHT!! Then, attach the equatorial mount to the tripod and tighten it in place from underneath using the horizontal axis clamp screw as shown in Figure 22 below.



Figure 22 -- Attaching the equatorial mount and tightening it in place.

Step 23: Insert the polar axis screw as shown below in Figure 23 below. Once that is attached, you can adjust the equatorial mount so that it is stable in an upright position.



Figure 23 -- Attaching the polar axis screw.

Step 24: Attach one of the flexible cables (the declination flexible cable control) to the worm gear drive as shown in Figure 24 below.



Figure 24 -- Attaching the declination flexible cable control.

Step 25: There is a groove in the worm gear attachment, use the thumb screw to tighten the flexible cable control to the worm gear drive as shown in Figure 25, below. Make it good and tight!



Figure 25 -- Tightening the flexible cable control.

Step 26: Next, attach the other flexible cable (the right ascension flexible cable control) to the worm gear drive as shown in Figure 26 below. Be sure to tighten the thumb screw like you did in Step 25.



Figure 26 -- Attaching the right ascension flexible cable control.

Step 27: Slide the counterweight onto the balance shaft as shown in Figure 27.



Figure 27 -- Placing the counterweight on the balance shaft.

Step 28: Screw the balance shaft into the hole at the bottom of the declination shaft as shown in Figure 28. You can now use the set screw in the counterweight to hold the counterweight in place up and down the balance shaft. This will allow you to balance the telescope when it is completely assembled, making it possible to rotate the telescope smoothly by the slightest turn of the flexible cable controls.

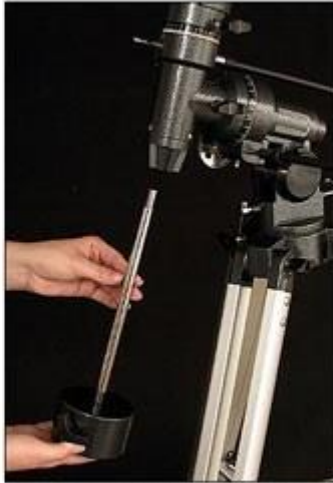


Figure 28 -- Attaching the balance shaft and counterweight to the equatorial mount.

FINAL ASSEMBLY OF THE TELESCOPE You are now ready to attach the main tube of the telescope.

Step 29: Remove the body belt from the main tube by unscrewing it from the main telescope tube. Then slide the body belt onto the equatorial mount as shown in Figure 29 below.



Figure 29 -- Attaching the body belts to the telescope's equatorial mount.

Step 30: Now you are ready to attach the main telescope tube to the mount. Be sure to tighten the body belt down well so that the telescope is firmly attached.



Figure 30 -- Now your telescope is attached to the mount.

Step 31: Attach the finder scope to the main telescope body using the screws that are preattached to the main telescope tube.



Figure 31 -- Attach the finder scope.

Step 32: Finally, remove the dust cap from the end of the telescope, and attach the angle prism as shown below. Use the small set screws to hold the angle prism in place. The included telescope eyepieces slide directly into the prism for a right-side-up view of the universe.



Figure 32 -- Attach the angle prism to the main telescope tube.

Step 33 Smile! You did it. Now go enjoy your telescope. You probably will want to align the sighting scope during the daytime because it is easier. You should do this outside and point the telescope at something at least 50 yards away .



Figure 33 -- Ready to observe.